NATURAL RESOURCES CONSERVATION SERVICE
Wyoming
CONSTRUCTION SPECIFICATIONS
FOR
DAM, FLOODWATER RETARDING

_____ (Owner/Operator)

_____ (Project Title)

GENERAL

Installation shall be in accordance with an approved design and plan. Details of construction shown on the drawings but not included herein are considered as a part of this specification. Construction activities shall be in accordance with applicable OSHA regulations.

SITE PREPARATION

Clearing and Stripping. Borrow areas and area to be occupied by the embankment shall be cleared of all trees, brush, logs, and sod. The ponded area shall be cleared as noted on the drawings.

Embankment Foundation. All channel banks and sharp breaks shall be sloped to no steeper than 1 horizontal to 1 vertical. All topsoil containing excessive amounts of organic matter shall be removed. Loose earth shall not be left on the foundation area to a depth in excess of 6 inches above undisturbed foundation material. The surface of the foundation area shall be thoroughly scarified before placement of the embankment material.

EXCAVATION

Cutoff Trench. The cutoff trench shall be excavated to the lines and grades shown on the drawings or as staked in the field. The trench shall be kept free of standing water during backfill operations.

Spillway. The completed spillway excavation shall conform to the grades, bottom width and side slopes shown on the drawings.

Outlet Conduit. Trench excavation for installation of an outlet conduit shall be made in original ground or in compacted fill provided the bottom of the trench is at or near undisturbed foundation.

Excess Material. Excavated material excess to construction requirements may be hauled from the site or placed and shaped behind a berm width equal to the pond depth, but not less than 12 feet from the edge of the excavation.

COMPACTED EARTHFILL AND BACKFILL

Fill Material. All fill materials shall be obtained from approved borrow areas and from excavations required for other parts of the work. The selection, blending, routing, and disposition of materials within the embankment shall be subject to the approval of the technician. Fill materials shall contain no sod, brush, roots, or other perishable or unsuitable material. Cobbles and rock fragments having a maximum dimension of more than six inches shall be removed from the materials prior to compaction.

Placement. The placing and spreading of the fill material shall start at the lowest point of the foundation. The fill shall be brought up

in approximately horizontal layers parallel to the axis of the dam and of such thickness that the required compaction can be obtained with the equipment used. Fill placed around structures will be brought up at approximately uniform height on all sides of the structure.

Moisture**.** The moisture content of fill material shall be maintained within the limits required to prevent the adherence of the fill material to the treads/tracks of equipment and ensure the crushing and blending of the soil clods.

Generally when soil material is squeezed in the hand it will retain a ball shape, but there will not be free water on the surface. As far as practicable the material shall be brought to the proper water content in the borrow pit before excavation. Supplemental water, when required, may be applied by sprinkling the materials on the fill. Uniform distribution of the moisture shall be obtained by discing, blading or other approved method prior to compaction.

COMPACTION METHODS

Compaction shall meet the requirements of the method designated and described below:

1. Sheepsfoot roller - The maximum layer thickness shall be 8 inches before compaction. The roller shall have staggered, uniformly spaced tamping feet and be equipped with suitable cleaners. The weight of the roller shall be not less than 2,500 pounds per foot of width. The maximum speed of the compaction equipment shall be 3 miles per hour. The entire surface of each layer placed shall receive six passes of this equipment to attain the necessary compaction. Adjustment in the number of passes may be necessary during construction.
2. Pneumatic tired equipment - The maximum layer thickness before compaction shall be six inches. A loaded scraper or wheel tractor maybe considered a pneumatic roller. The wheels of this equipment must pass over 95 percent of the surface of each lift before a new lift is placed.
3. Track laying equipment (Bulldozer) The maximum layer thickness compaction shall be 4 inches. The tracks of the equipment must pass over 95 percent of the surface of each lift before a new lift is placed.

Compliance with compaction requirements will be determined by observation of performance for methods 1, 2, and 3. Fill not meeting the specified requirements shall be reworked or removed and replaced with acceptable fill.

EQUIPMENT OPERATION

Heavy equipment shall not be operated within 2 feet of any structure. Hand directed tampers or compactors shall be used on areas not accessible to heavy compaction equipment and within 2 feet of any structure. Fills compacted in this manner shall be placed in layers not greater than 4 inches in thickness before compaction and shall meet the same density requirements as for adjacent areas.

The passage of heavy equipment will not be allowed over any type of conduit until the compacted backfill has been placed a minimum of two feet over the top of the pipe.

Compaction of backfill adjacent to structures shall not be started for at least the following minimum time interval after placement of concrete:

Walls & Counterforts	10 days
Antiseep collars, conduits, and cantilever outlet bents	3 days

CONCRETE

Concrete work under these specifications shall be constructed to the dimensions, lines, and grades as shown on the drawings. The subgrade for concrete shall be prepared as shown on the drawings or as directed by the technician.

Concrete compressive strength shall be at least 4000 psi at 28 days. The mix shall be in accordance with ASTM C 94 and this specification. When requested by the Technician the supplier shall furnish design mix and cylinder break test data.

Cement shall be low alkali Type II Portland cement.

Coarse aggregate shall be maximum size of 1-1/2 inches per designations of ASTM C 33.

Air entrainment conforming to the requirements of ASTM C 260, shall be used. The air content shall be 5 to 7 percent.

Forms shall conform to the shapes, lines, and dimensions as shown on the drawings. They shall be braced and/or tied together so as to maintain position and shape and; be sufficiently tight to prevent leakage of mortar. Forms shall be thoroughly oiled or wetted and cleaned of debris prior to placement of concrete.

Reinforcing steel shall be deformed bars and be free from rust, oil, grease, paint or other deleterious matter. Items to be embedded in the concrete shall be positioned accurately and firmly anchored to prevent displacement during placement of concrete.

Placement. The concrete shall be deposited as closely as possible to its final position and shall be worked into the corners and angles of the forms and around all reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance. Consolidation of concrete may be accomplished by means of internal type mechanical vibrators, rodding, spading, or hand tamping.

Construction joints shall be provided as shown in the plans or as approved by the engineer. Joints shall be thoroughly cleaned and laitance removed before a new pour is made. Each joint shall be wetted immediately before the placing of new concrete.

Finishing. After the concrete has been consolidated, the unformed surfaces shall be given a wood float finish. Immediately after form removal, formed surfaces shall be cleaned of all defective concrete and effectively repaired. Snap ties shall be removed and the holes mortared.

Protection and Curing. Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period. For formed surfaces, the protection may be accomplished by leaving the forms in place and keeping them wet for the entire curing period. Moisture shall be maintained by sprinkling, flooding, or fog spraying or by covering with continuously moistened canvas, cloth mats, straw, earth, or other approved material. In lieu of water curing, the concrete shall be cured by spraying with an approved sealing compound. The sealing compounds shall be applied as soon as practicable after the concrete is finished. All surfaces shall be kept moist until the compound is applied.

Concreting - in Cold Weather. Before any concrete is placed, all ice, snow and frost

shall be completely removed from all surfaces to be in contact with the new concrete and the temperature of these surfaces shall be raised to as close as may be practical to the temperature of the new concrete that is to be placed thereon. No concrete shall be placed on a frozen subgrade or on one that contains frozen materials. Concrete shall not be mixed or placed when daily minimum atmospheric temperature is less than 40 degrees F., unless facilities are provided to ensure the adequate protection of the concrete. Temperature of the concrete at the time of placing shall not be less than 50 degrees F. nor more than 90 degrees F. The temperature of all aggregates and mixing water shall be not more than 100 degrees F. when introduced into the mixer. The use of accelerators or antifreeze compounds will not be allowed.

Concreting-in Hot Weather. The Contractor shall apply effective means to maintain the temperature of the concrete below 90°F during mixing, conveying, and placing.

CONDUITS

Conduits shall be of the type and size as shown on the drawings. Pipe shall be new. Any damage to protective coatings shall be repaired prior to backfilling. Repairs shall be in accordance with manufactures recommendations. Conduits shall be firmly and uniformly bedded throughout its length and shall be installed to the lines and grades shown on the drawings and/or staked in the field.

Cutoff collars or a filter diaphragm shall be installed at the locations, to the dimensions and of the materials as shown on the drawings. Metal cutoff collars, when specified, shall be of at least 12 gage or thicker metal, be galvanized or have a coating consisting of one coat of coal-tar primer followed by hot coat of coal-tar enamel and finished with Kraft paper or coat of water resistant whitewash. Plastic tape suitable for coating buried steel pipe may also be used. All welds shall be cleaned and coated as above.

FENCING

Posts may be galvanized steel or wood. Steel posts should be a minimum of 6.5 feet long and wood posts a minimum of 7.5 feet long. Wood posts shall be cedar, redwood, or other decay resistant wood or treated with Dentachloro-phenal or creosote. Minimum top diameter for wood posts is 4 inches. All posts shall be firmly set into the ground, braced at all corners and turns, and spaced as shown on the drawings, but not to exceed 20 feet.

Wire. Barbed wire shall be a minimum of two strands of 12-1/2 gage, galvanized wire. Woven wire shall be galvanized, aluminum or plastic coated. Top and bottom wires shall be a minimum of 11-gage and intermediate line and stay wires shall be a minimum of 14-1/2 gage.

Hardware. Wire ties, clamps, staples, and related fence hardware shall have equivalent coating to the fencing being installed.

Pole or timber fence equivalent to standard barbed wire fence in usefulness and durability may be used as an alternate when authorized by the responsible technician.

SEEDING

Seed the embankment, borrow areas, spillway and other disturbed areas, and a minimum 12-foot border around the ponded area, unless suitable vegetation already exists. Seedbed preparation, seed mixture, fertilizer, mulch, and application rates shall be in accordance with the attached

ADDITIONAL SPECIFICATION for "Seeding".

RIPRAP

Rock for riprap shall be angular, dense, sound, and free from cracks, seams, and other defects conducive to accelerated weathering. The rock shall be well graded so that the installed riprap will consist of a dense layer of interlocked rock.

Bedding material when specified shall consist of a sand-gravel mixture such as would be used in a concrete mix.

CLEAN-UP

Cleared material, sod, and unsuitable soil shall be removed from the construction site or otherwise disposed of so that runoff water will not carry it into the reservoir or spillway area. Waste earth material shall be smoothed and seeded.

ADDITIONAL SPECIFICATIONS